Virginia Department of Health
Vaccinia Disease and Vaccinia Related Adverse Events: Overview for Healthcare Providers

Organism	Vaccinia virus, used in smallpox vaccine; genus *Orthopoxvirus*, family *Poxviridae*
Transmission	Inoculation with vaccine (Dryvax®) or through direct contact with vaccine site or infectious materials
Communicability	Communicable to unvaccinated contacts; maximum viral shedding 4-15 days post-vaccination; virus can be cultured ~ 2-5 days post-vaccination until scab separates (14-21 days post-vaccination); 2^{o} transmission usually results in eczema vaccinatum or inadvertent inoculation ~ 5-19 days post-exp.
Risk Factors	Eczema or atopic dermatitis and other acute, chronic or exfoliative skin conditions; diseases, conditions or treatments which cause immunodeficiency or immunosuppression
Pregnancy	Risk for fetal vaccinia if inadvertent vaccination during pregnancy; counsel female about risks to fetus
Normal Site Reaction	Papule (3-5 days post-vaccination) → vesicle (days 5-8) → pustule (maximum size in 8-10 days) → scab (separates 14-21 days post-vaccination) → pitted scar
Normal Variants (rate 2.4% - 6.6%)	Satellite lesions; lymphangitis from site to regional nodes; regional lymphadenopathy; considerable local edema at the site; intense erythema (viral cellulitis). Variants usually resolve spontaneously.
Adverse Events *Post-exp (post-exposure) means after inoculation with the vaccine or after direct contact with vaccine site or infectious materials.*	**Bacterial infections:** uncommon. Vaccinia Immune Globulin (VIG) not recommended. Obtain Gram stain, bacterial culture. Treat with antibiotics if clinically indicated; no topical medications.
Serious	**Inadvertent inoculation:** virus is transferred from vaccination site to 2nd location on vaccinee or close contact; most common adverse event; often involves face, eyelid, nose, mouth, lips, genitalia, anus. Use contact precautions. If few lesions, no specific treatment required; usually resolves ~ 3 weeks. Administer VIG with extensive lesions, especially if confluent or covering large portions of body.
Serious	**Ocular vaccinia:** inflammation involving periocular soft tissue or the eye itself (conjunctivitis, blepharitis, iritis or keratitis). Consult ophthalmologist. Treat with off-label topical antivirals. Administer VIG for severe conditions. **For Keratitis**: Consult ophthalmologist immediately. Treat with off-label topical antivirals; consider topical prophylactic antibacterials. VIG contraindicated unless life or other vision-threatening conditions present.
Serious	**Erythema multiforme:** rash may be erythematous macules, papules, urticaria, bulls-eye lesions, and rarely vesicles. Occurs ~ 10 days post-exp. Treat symptoms; consider oral antipruritics. Rare evolution to Stevens-Johnson syndrome requires hospitalization. VIG not recommended. *Diff.Dx: generalized vaccinia; inadvertent inoculation.*
Serious	**Generalized vaccinia:** disseminated maculopapular or vesicular lesions; usually self-limiting; occurs ~ 6-9 days post-exp. Use contact precautions. Cover lesions; if not possible, avoid physical contact with others. Administer VIG if severe/recurrent but not if mild or limited. Antivirals usually not indicated. Consider NSAIDS; oral antipruritics. *Diff.Dx: erythema multiforme, eczema vaccinatum, progressive vaccinia, severe varicella; inadvertent inoculation at multiple sites; smallpox; disseminated herpes.*
Life-threatening	**Eczema vaccinatum:** vaccinial lesions, generalized or focal, in persons with eczema/atopic dermatitis history. Occurs ~ 5-19 days post-exp. Fever/lymphadenopathy often present. Use contact precautions. Early diagnosis & early treatment with VIG are critical. Monitor patient for secondary skin infections.
Life-threatening	**Post-vaccinial encephalopathy/encephalomyelitis:** uncommon; occurs ~ 6-15 days post-exp with change in mental status (confusion, delirium, somnolence) or in sensorimotor function (altered sensation, paresis). VIG not recommended; supportive care; anticonvulsants as needed.
Life-threatening	**Progressive vaccinia:** severe, potentially fatal, spreading necrosis at vaccination site; metastatic necrotic lesions may occur elsewhere on body. Suspect if lesion progresses w/o healing ≥15 days post-exp. Use contact precautions. Administer VIG. Surgical debridement not proven useful. *Diff.Dx: severe bacterial infection; severe varicella; other necrotic conditions; disseminated herpes.*
Life-threatening	**Fetal vaccinia:** extremely rare; vesicular, pustular or ulcerative rash in newborn of vaccinated mother. Efficacy of VIG in newborn is unknown; antivirals not recommended.
Sample Collection	For consult, page the state lab (DCLS), available 24/7, at 804-418-9923.
Treatment (IND)	VIG and Cidofovir can be obtained only after consultation with local health department or CDC Clinician Information Line, available 24/7 at 877-554-4625. Cidofovir is for 2nd line treatment only.
Infection Control	Virus inactivated by a solution of 1 part household bleach to 9 parts water (0.5% sodium hypochlorite solution). After contact with vaccine site, wash hands thoroughly with soap and water or disinfectant.
Public Health	Suspected cases of vaccinia disease and vaccinia adverse events must be reported to the local public health department by the most rapid means available.

For more information, refer to: CDC. Smallpox vaccination and adverse reactions: Guidance for clinicians. MMWR Dispatch 2003;52(January 24, 2003):1-31 Available online at: http://www.cdc.gov/mmwr/preview/mmwrhtml/di52cha1.htm

Updated 12/16/2004